SOME ADDITIONS TO THE FLORA OF GRAND MANAN ISLAND, NEW BRUNSWICK

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The Vascular Flora of Grand Manan was excellently presented by Weatherby and Adams in 1945 (1) and has served as an admirable source of reliable information relating to our current floristic study of the nearby Wolf Islands and other islands in the Bay of Fundy.*

In connection with our work a number of questions had arisen that bore directly on Grand Manan, so in July 1961 we visited Grand Manan and Long Island for parts of two days and in August returned for three days of active botanizing on the main island as well as on Outer Wood and White Head Islands. One of our main projects was to determine whether a considerable number of taxa that we had found on the Wolf Islands but which Weatherby and Adams had not reported from Grand Manan, actually were absent there. This turned out to be true so far as our observations and collections were concerned, thus confirming our opinions that a fairly thorough canvass had been made of the Grand Manan flora. However, as a by-product of our work, a number of new records were compiled as well as one somewhat questionable record confirmed. These additions will now be considered along with a few problems that still invite further study.

Lycopodium tristachyum Pursh. — On the evening of August 21 while on our successful search for *Pinus resinosa*, we encountered a dry somewhat sandy area with a sparse growth of *Vaccinium myrtilloides*, *Kalmia angustifolia*, *Rhododendron canadense* and associated species. Here we found a few individuals of this clubmoss with its characteristically deeply embedded rhizomes. Though lacking strobili there seems to be no question about its identity.

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Specimens of this and other taxa listed here as additions to the flora of Grand Manan, unless especially noted, are deposited in the Gray Herbarium and in the Herbarium of the University of New Hampshire.

Tsuga canadensis (L.) Carr. — Hemlock was included in the "Flora" on the strength of Allan Moses' report of a single tree in the ravine of Dock Brook. There is little reason to doubt this record but we were unable to find any hemlock trees though we scrutinized Dock Brook and its environs carefully except for a short lower section. It is perhaps more surprising that hemlocks are not more prevalent on Grand Manan. It is of some significance certainly that, during our search for Red Pine, on August 21 we collected a branch of *Rhododendron canadense* with its leaves conspicuously infected with a rust which has been identified by Dr. Avery Rich, Plant Pathologist at the University of New Hampshire as *Pucciniastrum myrtilli* (Schum.) Arth. The alternate host of this rust is *Tsuga canadensis*. Presumably further search for hemlock should be carried on in this part of the island. This specimen of rust is in the mycological herbarium at the University of New Hampshire.

Pinus resinosa Ait. — Weatherby and Adams loc. cit. p. 77 placed this taxon in their list of "Doubtful and Unverified Records" attributing it to Perkin's list. They stated of this record as follows "very likely correct, though the soils of Grand Manan are not such as the red pine prefers."

We first heard of the possible occurrence of red pine in July from Mrs. Earl Green of Grand Harbour. She told us that her father a Mr. Cheney knew of some "different pines" and that she could find someone to direct us to specimens of them. We much appreciate her assistance in providing us with the services of Terrance Ingalls, a very energetic and intelligent boy from Grand Harbour, who on August 21, led us to a number of fine trees of *Pinus resinosa* a short way inland from Grand Harbour. There were several scattered trees of good size varying from one to two feet dbh. Seedlings were observed in the vicinity of the

larger trees but no intermediate small specimens were noted. These pines were scattered over a sufficiently wide area to lead one to hope that some of them may continue to survive there for many years to come.

Eleocharis tenuis (Willd.) Schultes var. *tenuis*. Toward the end of our unsuccessful search for hemlocks along Dock Brook we didn't want to return empty handed so our attention wandered to other things. In a moist opening along a wood-road we saw a fine growth of *Eleocharis* growing with *Juncus articulatus*. After very careful examination our specimens, which are in good fruiting condition, prove to be *E. tenuis* var. *tenuis*. *E. elliptica* Kunth resembles *E. tenuis* in some of its vegetative characteristics and in its general appearance and it has been collected on Grand Manan. The achenes of the two species are very distinct, those of *E. elliptica* being pronouncedly yellow while those of *E. tenuis* are olivaceous and smaller. The tubercule also is less compressed in *E. tenuis*. We compared our material carefully with the specimen of *E. elliptica* from Grand Manan and with reliable specimens of both *E. elliptica* and *E. tenuis* in the New England Botanical Club Herbarium.

Betula papyrifera Marsh var. *cordifolia* (Regel) Fernald. — Weatherby and Adams loc. cit. p. 41 listed no variety of this species nor made any comment about its variability on Grand Manan. Fernald's treatment of the series *Albae* in eastern North America (2) appeared at about the same time that the Grand Manan Flora first came out in the autumn of 1945. For this reason Mr. Weatherby may not have been stimulated to study birches very closely during the years preceding this when he was actively investigating the flora. Most of the *Betula papyrifera* of Grand Manan is whitish barked but in 1955 the junior author noted a birch of this variety with dark bark and abundant catkins along the road to the Whistle House. At that time the area was densely wooded.

On August 23, 1961 we revisited this locality, which had been lumbered for the conifers in the interim, finding many of the birches in question with abundant catkins, dark

bark and leaves mostly cordate-based. We took specimens from ten trees which we hope to study later along with similar population samples which we have from the Wolf Islands and Lubec, Maine.

Thlaspi arvense L. — A specimen in fruit with no leaves was collected by us at Dark Harbour on August 22, 1961. We have noticed in examining the Weatherby and Adams list that several very common and widespread weeds and introduced plants have not yet been reported. This and the taxon to follow will help to augment the list of introductions. Specimens of these are to be found in the herbarium at the University of New Hampshire.

Raphanus raphanistrum L. forma *sulphureus* (Babey) Hayek. — Since Weatherby and Adams often reported conspicuous forms in other groups it is appropriate to record this one which we collected at Dark Harbour.

Rubus canadensis L. — Weatherby and Adams loc. cit. p. 52 state that *R. canadensis* L. is "the common high-bush blackberry of the island." In August 1955 the junior author and Dr. Donald L. Craig of Kentville, Nova Scotia (3), who then was working with *R. canadensis* at the University of New Hampshire, spent several days on Grand Manan searching for good material of that species. Following the interpretation of Bailey (4) and that of Fernald (5) of *R. canadensis*, good material was conceived of as being essentially without prickles, comparable in this respect to the usual specimens of *R. canadensis* that are so common in northern New England and in cooler mountainous areas farther to the south. Surprisingly a very small percentage of the specimens seen in the summer of 1955 qualified as typical *Rubus canadensis*. Most of the plants were of varying degrees of prickliness, in this respect fitting either *R. amicalis* Blanch. or *R. elegantulus* Blanch. as these are interpreted by Fernald (5). But it is to be noted that Weatherby and Adams, loc. cit. p. 53 relied on Bailey for the identification of their blackberries. Bailey's treatment of *R. canadensis* in 1944 was a peculiar one particularly in the light of his usual tendency to split the species as finely

as possible. After a preliminary delineation of *R. canadensis* as an essentially smooth blackberry, he combined *R. elegantulus* with it as only "a small and usually slender phasis" (see Bailey loc. cit. p. 475). The Grand Manan plants present a particular problem because they combine the prickliness of *R. elegantulus* and *R. amicalis* with the features that are commonly associated with *R. canadensis* including large size and strongly racemose inflorescences. Except for the degree of prickliness, most of the bigger plants certainly resemble *R. canadensis*.

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CYTOLOGICAL OBSERVATIONS OF POLYGALA IN EASTERN NORTH AMERICA

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For a genus of over 450 species, of which no fewer than 200 are described in North and Central America, only 15 species of *Polygala* have been studied cytologically. No New World species are included in this meager total.

Unfortunately, the *Polygala* material is not particularly favorable for study. At meiosis the greatest difficulty is the low number of pollen mother cells formed in each anther, giving few figures for observation when a satisfactory stage is obtained. Under these circumstances, we have found that much more fixed bud material must be

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